

may be what is behind it, but it is still really not the way to proceed. To say that Supreme Court nominees would only need 51 votes instead of 60, again there would be no consensus on the very important selection of Supreme Court judges.

Again, I think it is just the right wing of the Republican Party that wants to appoint extreme conservatives to the highest court in the land and they simply know they cannot do it if they have to meet the 60-vote threshold. The White House does not want to nominate another David Souter or an Anthony Kennedy or a Sandra Day O'Connor or a Steven Breyer, all of whom were confirmed with nearly unanimous bipartisan support. Instead, it wants to divide the country by picking a right-wing Supreme Court nominee that it knows could not garner bipartisan support.

I just think that again although the motivation may be in terms of the Supreme Court, the bottom line is that we should not be sacrificing this very important safeguard of our democracy, the filibuster, just to appoint some conservative judges that the President wants to nominate.

The last thing I wanted to say, again there is a difference between the House and the Senate. The framers did not want the Senate and the House to be the same. They saw two different bodies. One of the things that would likely happen is if this nuclear option was presented and the filibuster was overturned is the Senate would basically become a second House of Representatives. That is not what the Founding Fathers envisioned when they created two distinct Chambers.

Again, I do not know what is going to happen, but I think we have to speak out and say that this is not just something that myself and my colleague from Michigan feel strongly about. I know and I have even seen polling that suggests that the American people feel very strongly about this. That is one of the reasons why we had this 2 or 3-week filibuster at Princeton University and why some of the Princeton students came down here last week and brought a bus, they called it the "filibus," we were down on the Mall and we spoke to make the point of how important the filibuster is as a safeguard of democracy.

#### PEAK OIL

The SPEAKER pro tempore (Mr. INGLES of South Carolina). Under the Speaker's announced policy of January 4, 2005, the gentleman from Maryland (Mr. BARTLETT) is recognized for 60 minutes.

Mr. BARTLETT of Maryland. Mr. Speaker, the special orders of this evening, I think, have been a good example of a problem that faces families and businesses and countries and indeed is facing the world today and that is the tyranny of the urgent. So often, no matter whether it is your family or

your business or your government, the urgent takes precedence over the important. It is really urgent that we are talking about confirmation of the judges in the Senate and the possibility of the nuclear option. This is just an example of how frequently the need to deal with the urgent diverts us from considering things which in the long run are going to be very much more important than that.

Let me give you an example of what I am talking about here, and this is an article written by Matt Savinar. The introduction to it will really grab your attention if he is correct. This is what he says:

"Dear Reader:

"Civilization as we know it is coming to an end soon. This is not the wacky proclamation of a doomsday cult, apocalypse Bible prophecy sect or conspiracy theory society. Rather, it is the scientific conclusion of the best-paid, most widely respected geologists, physicists and investment bankers in the world. These are rational, professional, conservative individuals who are absolutely terrified by a phenomenon known as global peak oil."

It is not just Matt Savinar that is concerned about this because he quotes several people in his article. One of them is an investment banker that he referenced. That is Matthew Simmons, with whom I had lunch last week.

□ 2200

Simmons and Company International is considered the most reputable and reliable energy investment bank in the world. Given Matthew Simmons' background, what he has to say about peak oil is truly terrifying. For instance, in August of 2003, in an independent interview with "From the Wilderness" publisher Michael Ruppert, Simmons was asked if it was time for peak oil to become a part of the public policy debate. He responded, "It is past time. As I have said, the experts and politicians have no plan B to fall back on. If energy peaks," he might have said when energy peaks, "it will be a tremendous jolt to our economic well-being and to our health, greater than anyone could ever imagine."

When asked if there is a solution to the impending crisis, Simmons responded, "I don't think there is one. The solution is to pray. Under the best of circumstances, if all prayers are answered, there will be no crisis for maybe 2 years. After that," he says, "it's a certainty."

Mr. Speaker, if we are talking about things that are important, if he is correct, and this evening we will explore the evidence so that the listener can make up their own mind, but if he is correct, this truly is something which is important.

Former industry insider Jan Lundberg recently pointed out: "The scenario I foresee is that market-based panic will, within a few days, drive prices skyward." He is talking about a time when oil prices are peaking and

that this is the response of the market. "And as supplies can no longer slack daily world demand of over 80 million barrels a day," which it is now 84 million barrels a day, "the market will become paralyzed at prices too high for the wheels of economy and even daily living in 'advanced' societies. There may be an event that appears to trigger this final energy crash, but the overall cause will be the huge consumption on a finite planet."

In an earlier hour this evening, the gentleman from Michigan (Mr. EHLERS) shared part of his Special Order hour with me, and he tells the story of when he was a little boy, he was told that there was about 250 years of oil remaining in the world. That was grossly over-optimistic; but even if it were true, his immediate response, he says was, gee, what will the world do when the oil is gone?

We may now be approaching peak oil. What will the world do?

"The trucks," he says, "will no longer pull into Wal-Mart or Safeway or other food stores. The freighters bringing packaged techno-toys and whatnot from China will have no fuel. There will be fuel in many places, but hoarding and uncertainty will trigger outages, violence, and chaos. For only a short time will the police and military be able to maintain order, if at all."

I am not sure that this has to be true. I really hope that it does not have to be true. And what we will be doing is talking about some of the things we need to keep it from being true. And I am sure all have heard of the Lundberg reports on gas prices.

Dr. Ted Trainer explains in a recent article on the thermodynamic limitations of biomass fuels, and this is his quote: "This is why I do not believe consumer-capitalist society can save itself. Not even its 'intellectual' classes or green leadership give any sign that this society has the wit or the will to even think about the basic situation we are in. As the above figures make clear, the situation cannot be solved without huge reduction in the volume of consumption."

Going on in a few moments we will have a chance to look at some curves that put that in context.

Dr. Smalley, in the February 2005, issue of Discover magazine gave the following prognosis as a result of the energy shortage brought on by peak oil and the fact that the world cannot produce oil as fast as the world's growing economies demand it: "There will be inflation as billions of people compete for insufficient resources. There will be famine. There will be terrorism and war." I hope he is not correct.

I am just reading these quotes, Mr. Speaker, to point out that it is not just one person. It is many people who are concerned about this.

The chief economist of Morgan Stanley recently predicted that we have a 90 percent chance of facing "economic Armageddon," while stating, "I fear

modern-day central banking is on the brink of systematic failure." No wonder someone like Matt Simmons says that the only solution is to pray.

And it is not just the people quoted in this article, Mr. Speaker. Recently, there have been two articles in major news weeklies. Just this week in U.S. News and World Report, an article on ExxonMobil points out that this giant was not able to meet its projection production last year. They slipped 5 percent, as a matter of fact. Although they made enormous profits, their stocks still fell because they did not meet expectations. The other article is one in Time magazine, and that is last week's Time magazine: "Why Gas Won't Get Cheaper," and they ask a number of interesting questions in the article and display a considerable understanding of the probability of peak oil. "Is the world running out of oil?" And the answer is "No." The world is not running out of oil. What the world is running out of is its ability to produce high-quality cheap oil on demand.

How did we get here? The chart that we have on the easel here shows a prediction that was made in 1956, and I keep coming back in discussions to M. King Hubbert because it was his predictions that started this discussion, which has now been going on for half a century. In 1956, he predicted that the United States would peak in its oil production about 1970. As a matter of fact, it was exactly 1970. How could he do that? How could he watch what was happening in 1956 and conclude that we would peak in oil production in this country in 1970?

What he was doing was watching the exploitation and exhaustion of individual oil fields, and he noted that they all followed a very similar pattern. They followed a bell curve, lots of bell curves. If we measure people, how tall they are, we will see some are very short, most are bunched in the middle, and a few are very tall. If we weigh people to see how much they weigh, we will find a few are 60, 70, 80 pounds, very few at that weight. A few would be up at 600, 700, 800, very few there. But the big mass of people are bunched in the middle, and that is called a typical bell curve.

He found that the production of oil followed this curve that is well known to scientists and statisticians. When oil is plentiful in the ground, it is easily pumped and it reached a peak, and he found that when it had reached that peak production rate that about half of the oil had been pumped.

It is reasonable, Mr. Speaker, that the last part of the oil would be more difficult to get. As a matter of fact, I just heard today that the scavaging wells that we have in our country, the yield between three and 10 barrels of oil a day, much of it electrical energy in pumping, are requiring more energy to get the oil out than we will get out of the oil. But, never mind, we may have enough electrical energy, and one

cannot put that in their car unless they have awfully big batteries and then it will not take them very far.

But we really do need the oil, and so they are producing the oil, which energy-wise is uneconomical to produce. So after we reached the peak production, we started falling down what is called Hubbert's Peak. This is a well-known phenomenon and M. King Hubbert became a celebrity among his peers because he predicted that the United States would peak in oil production in 1970. He looked at the world situation and made some guesses to how much more oil the world would find. And, by the way, most of it had been found during his lifetime. We are now pumping it some 30 or 40 years after it was found.

And he made a prediction of when oil production would peak in the world, and he said that that would be about the turn of the millennium. It was a little after that, obviously. He could not have known about the Arab oil embargo or the oil price hikes or the worldwide recession that reduced the demand for oil, and so we had a few years of grace. Mr. Speaker, I would like to point out that if M. King Hubbert was right about the United States and, using those same analysis techniques, he predicted that the world would peak in oil production at about the turn of the century, why should the world leaders not have been concerned that maybe, just maybe, he was right about world oil production peaking about the turn of the millennium? And if that was true, then we should have been embarking on an aggressive program to develop alternative energy sources.

Before leaving this, I would like to point out that the red is what happened in the Soviet Union and now Russia. There are going to have a second little peak here because they kind of came apart when the Soviet Union was dissolving, and we see the oil they pumped did not meet the expectations of the Hubbert's curve.

The next chart I want to show is kind of a schematic curve that shows the relationship between oil demand and oil use. During all of history until this time, there has been adequate oil in the ground and adequate capability to pump it that the oil supply has been equal to the demand for oil. But when we are reaching the peak of this curve and demand keeps on going up, there will be an increasing discrepancy between the amount of oil we would like to use and the amount of oil that is available to use.

This is a 2 percent growth curve. With 2 percent growth compounded, it doubles in 35 years; and so from this point to this point, it has doubled. So that is about 35 years. So it shows that rolling over this peak, and, by the way, sometimes this phenomenon is known as "the great rollover." We have been referring to it as peak oil. It about 35 years from this point to the end of the yellow there. And this points out that

the world problems with oil will occur considerably before the peak. In this schematic, it occurs about 17 years before the peak.

Have we peaked? It may very well be a few years in the future. But as production slows down as we reach that peak and demand keeps on going up, even before we reach the peak, there will be a discrepancy, a difference, between what we would like to use and what is available to use.

The next chart shows us something about the challenges that we face, and this is an interesting chart. The top graph here shows the history of the use of energy in the world, going clear back to the 1600s and bringing us up to the present. The brown curve here is wood; and for a very long time, that was the world's only energy source. And then the Industrial Revolution was almost floundering because we had decimated the forests in New England. There are now more forests in New Hampshire than there was at the time of the revolution because we had used the trees in very large numbers for producing coke, for producing charcoal, for producing iron.

And then we discovered coal, and notice how many more quadrillion BTUs we were able to produce with coal. That is for two reasons: one, because the energy density of coal is higher, and because it is more convenient to use.

□ 2215

And then, long before we ran out of coal, we transitioned to oil. And notice then what happened to energy use. That is because, again, these two qualities of oil, one is it is more convenient to use; you could have a coal cart following the engine and shovel coal as we did in trains for a long time and run the train on coal. That is very difficult to do with your car, but oil you can put in the tank of your car, and so we found lots more uses for energy, and the energy density of oil is greater than the energy density of coal. So we see a greatly increased production of BTUs with oil.

The challenge that we face as we roll over Hubbert's Peak, and the available oil does not meet the demands for oil in the world; the challenge we face is to find energy sources which can replace oil. Now, unless there is some sort of energy that we have not envisioned yet that is hidden out there, we just need to go find it, we are going to have to deal with the energy sources that are available to us.

The next chart shows us the energy density of a number of different substances, and it begins with something like domestic refuse which, by the way, can produce a lot of electricity if you burn it rather than putting it in a landfill; brown coal, which is a very poor quality coal, baled straw, this is the biomass that you may hear people talking about, dried dung, we burned buffalo chips when our forefathers went

west in this country, and they still burn dried dung in many parts of the world, and then that is just about the same as wood. Notice that coal is better than wood, higher energy density than wood. Then we go through coke and ethanol, and notice that ethanol does not have the same energy density, it is considerably less than crude oil and, of course, as you refine it, why you get the diesel and petrol, the automotive gasoline, naptha is still higher, aviation fuel is still higher, and natural gas, which contains relatively more hydrogen, still has a higher energy density.

Just a word about this energy density and what that really means. The energy density in these fossil fuels is just incredible, and we have kind of taken them for granted, and we have fashioned a society and economy which is just about totally dependent on them. The energy in one barrel of oil, that is 42 gallons of oil, which today at the pump will cost something like \$100; it is about \$50 to buy it and another \$50 to refine it and transport it to the station. You are paying a little over \$2 a gallon, so that is about \$100 for that barrel of oil. That barrel of oil, Mr. Speaker, has the energy equivalent of about 25,000 man-hours of labor.

Now, in another life, I worked for IBM and we prepared a lot of responses to proposals, and we would price our manpower in man-years, and a man-year was 260 hours; that is the number of hours a person works in a year. So if I divide 260 hours into 25,000, I get roughly 12 man-years. What that means, Mr. Speaker, is that with this barrel of oil that costs you \$100, you have bought the work equivalent of 12 people working full-time for you for one year. What a cheap servant fossil fuels have been for us, and how addicted we have become to using them.

Another little example so that you can get perhaps a more personal appreciation of the energy density of these fossil fuels, imagine how far a gallon of gasoline, not very large, and still cheaper, by the way, than water in the grocery store, unless you buy it in a gallon jug in Wal-Mart or K-Mart or some place like that; but note how far that gallon of gas takes you in your car. And if you are going up a mountain, how long it would take you using some mechanical advantage to pull yourself up that mountain, and you can get some notion as to the energy density in these fossil fuels and the enormous challenge we have in finding alternatives, and alternatives we must find.

The next chart takes a look at some of the options that are available to us as we transition from our enormous dependence on oil and natural gas, which tend to go together, because natural gas is kind of a volatile from oil, it exists generally with oil; remember pictures of old oil derricks that are burning the natural gas off, we did not have pipelines, it was just a waste product and they burned it off. The gas is col-

lected there, it is gas associated with oil; if not, it is vented through the millennia to the atmosphere. Of course, we have some fields of only gas and they generally are much deeper where there has been more heat and all of the oil has, in a sense, been vaporized and become natural gas.

Here we have a list of the alternatives that are available to us, and there are some finite resources that we can tap, and we will need to do that, but we need to recognize two things. One is that there is some economic and environmental penalties that we will need to pay for tapping some of these, and the second is that they are also not forever. So we must not conclude that if we are successful in developing some of these; well there is one of these that could be forever and that is nuclear fusion. I think the odds of getting there, Mr. Speaker, are relatively small; about the same odds as you and I planning on our economic future by winning the lottery. That would be nice, but unlikely, and I think that fusion would be very nice, but just about as unlikely.

We have some enormous deposits of tar sands in Canada, and they have invited us to come there this summer to look at those. They are being exploited, by the way, and China has bought the rights to purchase much of the oil that they are producing from the tar sands and the oil shales. There is a lot of potential oil there. But the problem is that it is very difficult to get. It takes a lot of energy to get, with a pretty high environmental penalty. In a few moments we will show a chart that looks at energy profit ratios and we will see where the tar sands and oil shales fall on this plot.

Then there is coal. I would like to digress for just a moment. We will come back to this chart, but let us look at coal, because I know some people say, gee, we have a lot of coal in this country and China has a lot of coal, we are the two biggest economies in the world now, and why worry, we will just burn coal. And your children may come home from school and tell you there is a 500-year supply of coal. That really is not true. The best estimates today that, at current use rates, with no growth, there is about a 250-year supply of coal. Well, gee, that sounds like a lot of coal. Well, that would tide us over.

But notice what happens when I assume just 1.1 percent growth rate. Remember those exponential curves we showed; with just 1 percent growth rate. Notice what happens with 2 percent growth rate, it drops down to about 100 years. But since there are not very many uses for coal directly, except maybe firing a furnace that produces steam that drives a turbine that produces electricity, we are going to have to convert coal into gas and into oil.

I remember as a little boy that all of the lamps that we burned were not kerosene lamps, they were called coal oil

lamps, and that is because we learned that before we were refining oil to get kerosene, we had learned how to get oil from coal, so we can do that again. But notice what happens. When you recognize it, you are going to have to spend some of the energy in the coal to convert the coal to more usable forms. Now, our 250-year supply of coal, with no growth, now has shrunk to just about 50 years. When we have only a 2 percent growth and, by the way, last year the world economy grew 5 percent, we grew about 2 percent, the world economy grew 5 percent, and China's economy grew at about 10 percent last year, which, by the way, they doubled their economy in just 7 years.

We are going to have to depend more on coal clearly to tide us over, but it is a fantasy that it will carry us through to the indefinite future. We have to recognize that it is a resource that we have to use wisely.

Let us go back now to the original chart and look at the nuclear, this is a nuclear option, which is a little different than the other one, because we do have some nuclear options here. We produce 20 percent of our electricity with nuclear power plants in this country. France produces about 70, 80 percent of their electricity with nuclear power. There are three ways in which you can use nuclear power to produce electricity. One of those I mentioned already and that is fusion, and that is what the sun does. That is why we get so much energy from the sun. That is the hydrogen bomb, and you get a lot of energy from that over a very short time period, and it becomes difficult to effectively utilize that, but we are trying. We are trying to exploit fusion so that we can use it in a scale large enough to produce electricity economically. If we ever get there, we are kind of home free, Mr. Speaker, because this really could produce energy with which we could do wonderful things in the world. But the odds of getting there are pretty small, I think. You can use your own judgment, but I think that they are pretty small. So it is something that we need to keep pursuing, but let us not bank on it.

There are two other ways we can use nuclear power. One of them is in the lightwater reactors that uses fissionable uranium, which is probably in shorter supply in the world than either gas or oil. And so that is not a final solution. We really have to ramp up nuclear, and we really seriously need to look at nuclear power. I know there are some environmental concerns, and as long as oil was plentiful and natural gas burns cleanly, why worry about nuclear when you can burn these fossil fuels. But if, in fact, Mr. Speaker, we are at or will soon be at peak oil, then we need to reevaluate nuclear, and I know some of my friends are now taking a new look at nuclear who have been kind of stoutly opposed to nuclear in the past.

Well, since fission with fissionable uranium is limited because of a limited

supply in the world, the third way to produce electricity from nuclear is what is called the breeder reactor. We have none of those in this country. The only one we have here were producing nuclear weapons. France has a number of them. As the name implies, they produce more fuel than they use, and so this could be a big energy source. But it produces, the way we now use it, it produces by-products, Mr. Speaker, which have to be stored away for maybe as much as a quarter of a million years.

I have a feeling that anything which is so hot, that it has so much energy in it that you have to squirrel it away for a quarter of a million years ought to have enough energy in it that resourceful, creative, innovative people could find some use for it. And I think that that is a challenge that we need to address, because if we are going to have anything like a smooth transition and not have the dire predictions that I read in Savinar's article here, if we are going to have anything like a smooth transition to alternatives, we are going to have to use a whole lot more nuclear than we are using now to buy us time to move to these renewables.

Now, with nuclear, we are limited in the kind of energy we can produce. Heat, which can boil water and run turbines and produce electricity, that is the way we use nuclear energy now. Of course, there are limited things we can do with electricity, and so there are other types of energy that we need equivalent to the type of energy that we get from oil.

Now we look at some truly renewable sources, and the gentleman from Michigan (Mr. EHLERS) earlier this evening was talking about how this is our income, and we ought not to be dipping into our savings, and our savings are things like tar sands and oil shales and coal and so forth; we ought to be able to make due with our income and if you keep dipping into your savings, by and by you will be bankrupt. That is what we have pretty much done as a society is dip into these savings and, from an energy perspective, we are near bankruptcy.

So you look at all of these renewables now and by and by, with the exception of nuclear and how much of that you are willing to put up with in terms of environmental effects and so forth, we are going to have to have a society that runs on these renewables, because obviously, fossil fuels are not forever. Solar is one of them. And by the way, Mr. Speaker, most of the energy that we are using or will use came from or comes from the sun. It is no wonder the ancients, so many of them, worshipped the sun, because they intuitively recognized it as the source of life. It was the sun that made the plants grow, that produced the coal. As a little boy I remember we used to use what was called run-of-mine coal. You took it from the mine just as it came, some big lumps and some dust, and I grew up in western Pennsylvania, and

some of the lumps were so big we could not put them in our furnace.

□ 2230

And so I would go to the basement, and with a sledgehammer I would break the lumps of coal to get them small enough to throw in the furnace. And I remember the feelings that I had, Mr. Speaker, when I broke open those big lumps of coal, and there was a fern leaf. And I recognized how many thousands of years ago that plant grew that was producing coal for us today.

And then, of course, it was the sun that made the little organisms grow in those ancient waters in a very much warmer Earth than we have today. It was warm at the poles because there is oil up at the poles. And these little organisms grew in the water. They would die and settle out to the bottom, and then in many places they would fall into deep crevices and the rains would wash sediment in over them. And time and pressure, the sediments were converted to rock, then with the movement of the tectonic plates in the Earth, they would sink down to where heat acting on this organic material trapped under the rocks would be converted to oil and gas.

And so all of the fossil fuels that we are burning came from the energy of the sun. Today, we can harness the energy of the sun in many ways. You build a house with windows that face south, and your house will be warmed by what we call passive solar heating. You can put a little mechanism on the top of your house that has a copper pipe painted black usually inside of it, under glass. You know what happens to your car in a parking lot, it gets really hot inside that glass, and you can heat your water with it.

We now have developed technologies where we can convert the photons into electricity. And the gentleman from Michigan (Mr. EHLERS) earlier mentioned the thin films that we have developed that you can incorporate in tiles for your floor or roof shingles for your house, or siding for your house, which can produce electricity.

That has been fairly expensive, like 26 cents a kilowatt hour. We pay about 7 now per hour now here in the East, but that is really coming down in price.

With oil at \$50 a barrel, and Goldman Sachs says it is going up to \$105, I do not how they picked that magic number, but since solar is coming down and the price of oil is going up, those curves will cross; and I hope we will see a whole lot more solar, because it is really clean. There are no byproducts, for at least 30 years. Those solar cells will sit there. Every time the sun shines or you have light, they will be producing electricity, less when there is no sun.

Then there is wind energy. Mr. Speaker, I have driven and seen some real forests of these wind machines, out in some of the passes in the West; and they are now producing electricity

at 3½ cents a kilowatt hour. Some people do not like their looks. I think they look a whole lot nicer than those swaths that we cut through our forests to run these high tension lines; and if we had more of these wind machines closer by, we would have less susceptibility to terrorist attacks, because we would have a distributed energy production, and we would not need so many high tension lines, and you would not have a grid which is at such risk.

Of course, the wind blows because the sun shines, and the differential heating produced by the sun causes the wind to blow, so that really is solar energy. We get it through wind, but it is the sun shining that makes the wind blow. And then there is true geothermal.

Now, that term is used in an interesting way in heat pumps. The ordinary heat pump is not very brightly, wisely conceived, because what it does in the winter time to warm you in the house, it tries to make the outside air even colder; and the summer time, to cool you in the house, it tries to make the outside air warmer.

If you are working not against the outside temperature, which can be zero in the winter time and 100 in the summer time, if you are working against the Earth or groundwater, obviously you are working against something which is a whole lot warmer in the winter and a whole lot cooler in the summer.

And they sometimes call that geothermal. But real geothermal is when you are doing what Iceland does and that is tap the energy from the core of the Earth, which is molten iron, and some places it comes close enough to the surface, sometimes it actually boils the water, it, of course, comes out through a volcano, but some places you can drill down deep enough, if you tap that heat, that is a very large molten core.

So that is an energy source that we have some places in the West we can tap that, which would be an important source of energy, but only in certain places. And then there is ocean energy. Two kinds of energy in the ocean. One is the waves, and of course we have waves in the ocean because the wind blows, and the wind blows because of the sun, and we come back again to the sun as the source of energy.

The other source of energy from the ocean are the tides. And this is about one of the few energy sources that does not come from the sun, and that of course comes from the Moon, because as the Moon goes around the Earth, it has the gravitational pull, and it is pulling the water up about 2 feet. How much energy would it take to raise the whole ocean 2 feet?

There is a whole lot of energy there if we could tap it. And we have tried, but that is very difficult, because there is an old axiom that says that energy, to be effective, must be concentrated. And these tides are spread out over far too great a distance, and they are difficult to tap.

But as energy becomes more and more critical, we should become more and more creative in how we approach tapping that energy source, because there is a lot of potential energy there that could be made available.

And the next point here is agricultural resources. This is one I really am very enthusiastic about. A few cautions, however. Our agriculture in this country is in trouble economically. And there are lots of potential sources of energy from agriculture. The soy diesel and biodiesel are an obvious energy source, and there are now engines today that will run on soy diesel, soybean oil, indeed, as well as on diesel fuel.

So this is a potential source of energy, ethanol, which everybody has heard about. And I would like to digress for just a moment and come back to this chart. I have another chart here that looks at ethanol. This points out some very interesting challenges that we have.

On the right here, it shows how you go from petroleum, that is crude oil, how you go from crude oil to gasoline. And it shows all of the energy inputs at every step from recovering it, to transporting it, to refining it, to hauling it to the gas station.

And to get 1 million Btus out of it, you had to consume 1.23 million Btus of fossil energy. So it cost you about 25 percent of the energy to produce the energy. On the other side here, we look at ethanol. And, of course, we start out with energy from the sun, and corn, and this is the energy input of the fertilizers and so forth to plant the corn and transport the corn and make the ethanol and transport the ethanol.

And for the same one million, it will be more volume, by the way. Do you remember the energy density? Lower for ethanol, more volume, but the same. We are comparing apples to apples, because it is a million Btus. To get a million Btus of ethanol, we had to use .74 million Btus of fossil fuel, still a net gain but not a really big net gain. But still worth doing.

The bottom here shows something really interesting. It shows the energy which is used to produce a bushel of corn. And I want to note how much of this energy comes from fossil fuel. Nitrogen. All of that comes from fossil fuel. All of the nitrogen fertilizers we have today are made from natural gas.

Until we learned how to do that, the only source of fertilizers was barnyard manures and guano. Guano is the droppings of birds and bats over thousands of years accumulating in caves and on tropical islands. There was an industry, before we learned how to make nitrogen fertilizer from natural gas, there was an industry that mined guano. That is gone now; that is not a resource we can fall back on.

By the way, Mr. Speaker, I do not know whether you have noticed or not in the summer time when you water your lawn, it is nowhere near as green as when you have a thunderstorm. You

may have wondered why. We used to call a thunderstorm poor man's fertilizer, because what the lightning does in the thunderstorm is to combine nitrogen of the air, and about four-fifths of all of the air is nitrogen, combines it in a form that can be carried down by the rain, into the soil so your lawn does look greener after nature waters it, as compared to you watering it, and that is because of the nitrogen which has been converted to a form by the lightning, which can be carried down by the water.

What will we do for nitrogen when natural gas is gone? Now we can produce it with other energy sources. But we are looking at enormous investments of energy. Because, look, nearly half of all of the energy that went into producing that bushel of corn is just the natural gas and the nitrogen fertilizer.

But let us go on. Here is the seed. Some energy went into growing that. Input hauling, that is fossil fuels. Purchased water. That was probably pumped using some fossil fuels. Chemicals, a whole bunch of those chemicals are made from fossil fuels, which, by the way, we have not mentioned the importance of oil and gas as feed stocks for an enormous petrochemical industry.

Some have very appropriately noted that gas, particularly, and oil are too good to burn. We live in a plastic world; that all comes from gas and oil.

And so many of these chemicals came from oil. For custom work, he came in to harvest on the combine. He used oil to drive his combine, oil helped produce the combine. Natural gas, electricity that could have been produced by these fossil fuels, oil or gas or coal. Here is liquid gas here, and gasoline and diesel fuel.

And then we come to the other two nutrients that we give corn in large quantities, that will put some lime on it to make sure that the Ph is okay. And then phosphate and potash. Now, we use fossil fuels in mining and hauling the phosphate and potash.

So you see, Mr. Speaker, that probably 95 percent, at least, of all of the energy that goes into producing corn comes from fossil fuels. The corn that we eat is in a very literal sense oil. Because if it were not for oil, unless we were producing corn in a very different way than we do today, we would not have corn to eat.

Let us go back to our selection of the options. And we were talking about ethanol, and methanol is similar. You get ethanol from the carbohydrates in plants and corn. You get methanol from sawdust and things like that. This is a one-carbon alcohol, this is a two-carbon alcohol. And then biomass. Biomass is just using corn stocks or switchgrass or trees or something like that to produce energy.

By the way, we still produce a lot of energy with wood. It is generally in industries where wood waste is a byproduct. If you have a lot of sawdust, you

burn the sawdust, and that produces energy. That is why the energy on one of those first charts I showed getting from wood is not zero now, because we are still using a fair amount of energy in some industries from wood because it is a waste product otherwise.

And then, of course, waste to energy. I mentioned that previously. We were looking at that as one of the lowest, that was the lowest on that chart, in fact, energy density. But, never mind. There is a whole lot of it. We still could get some meaningful energy out of it.

And then the last one here: hydrogen from renewables. And hydrogen bears spending just a moment talking about it, because hydrogen, contrary to what many people believe, is not an energy source. Hydrogen is, in effect, Mr. Speaker, pretty much the equivalent of a battery. A battery is a handy way to take electrons, electricity, and store them, and then get them back at another time at another place where you want to use it.

That is pretty much exactly what hydrogen is. There is no hydrogen out there that you can suck out of the air, or you can pump out of the ground. The way you get hydrogen is to invest energy to get it from natural gas, or to split water. Water is made up of two parts of hydrogen and one part of oxygen.

So you can get a lot of hydrogen from water. But you will always spend more energy making the hydrogen than you will ever get out of the hydrogen. Well, you say, gee, why are people talking about a hydrogen economy? And why is that a good idea if it will take more energy to produce the hydrogen than you will get out of the hydrogen?

It really is a good idea. And the reason it is a good idea is because once you have got the hydrogen, and you can produce it from like nuclear, coal, biomass, you cannot have a trunkful of garbage and run your car down, but you could produce electricity, and with electricity you could produce hydrogen, and then your car will run very well on that.

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When you are using the hydrogen, if you are burning it, it does not matter how you burn it, if you use it in a fuel cell or reciprocating engine, the fuel cell is much better because it has twice the efficiency. You just get water. So the only pollution you have to worry about is the pollution at the site where you made the hydrogen. And the economies of scale make it a whole lot easier to control the pollution there than it does in a million cars running up and down the road. I am very supportive of the hydrogen economy.

I really need to emphasize again, Mr. Speaker, this is not a solution to our energy problem, Mr. Speaker. It will not replace oil. Hydrogen is simply the equivalent of a battery. It is a handy way to take energy from one place, to store it, to take it to another place

where you can use it in a very handy form, that you can use it in a nuclear cell and get at least the twice the efficiency of a reciprocating engine, that is the kind of engine you have in your car or truck, and that produces only water as a by-product which is not polluting.

The next chart we will show you shows some of the characteristics that you will have to look for in substitutes for oil as we run down the other side of Hubbert's Peak. Here on the ordinate we look at energy profit ratios. What that is is how much energy you have to put in to get energy out. If you are putting in one unit of energy and getting one unit of energy out, you do less than that in producing hydrogen. You put one more than one unit to get one unit out, but never mind. It is still a good idea because hydrogen burns so cleanly and is used so efficiently in a fuel cell.

The abscissa shows the economic effectiveness, how easy is it to transport it and use it. So where you want to be is right in the upper right-hand corner and most giant oil fields are up there all alone. That is gas and oil of course. There is not anything out there that competes with these.

Let us look at the alternatives that we have been talking about. Here is the 1970s direct use of coal. It was sort of good on the energy profit ratio but, boy, was it inconvenient to use. It is way over here on the left. Trains used it directly. You had the coal car and you shoveled it into the train and produced heat and steam and you ran the train with that.

Here is photovoltaics. In 1995 they were not very good. Photovoltaics is another name for solar cells. But we are now getting very much better with them. We are probably even better than this chart shows that we are moving up here. But they will never move to the right because they are stuck on the roof of your house or something like that. So you have to use the energy from them if you want to go someplace like to charge a battery or make hydrogen so you can put that in your car and go with that.

Electricity is produced from hydro plants, from coal fire plants, from nuclear plants; and notice that it is down here very close to the abscissas and it cannot much move from there. And notice that the energy profit ratio is not very high. Never matter, because electricity is so convenient. We do so many things with it, that it really does not matter that it is not produced very efficiently. And of course you cannot transport it very well so it is stuck somewhere down here on the abscissa and it never goes very high on the ordinate.

Look down here, in the worst possible place to be in terms of energy-profit ratio and that is tar sands and ethanol. Of course, the worst place to be is here by zero. It has no energy-profit ratio and you cannot do anything with it. Once you get the oil out of the tar sands and once you get the

ethanol, then it is very convenient. But notice how far it is down here in terms of energy-profit ratio. We are putting almost as much energy in as we are getting out of it.

Here is U.S. oil in the 1970s. It was up here, very convenient to use. But it is way down in energy profit ratio because we pumped our good oil a long time before 1970, our easy to get oil. We peaked in 1970 as you know. This is the oil use in 1985. It is sliding down. We are now in 2005. 20 years later. Look what it did in these 15 years. For our oil we are down somewhere near zero here. We are putting in almost as much energy as we are getting out. But never mind because the energy we are putting in is more convenient to get, like electrical energy.

I mentioned previously that some of our stripper wells, we are putting in more Btus of electrical energy than the Btus we will get out of the oil. But we are still doing it because oil is a commodity that is just so useful in our society.

The next chart shows us the transition that we need to go through if we are going to be successful in going from our enormous dependence on fossil fuels, particularly oil, and gas, if we are going to transition to these renewables. The first thing we have to do is voluntary conservation.

We have a chart if we can find it of the situation in California. It shows what the Californians did voluntarily. As you can see from this chart, this graph, the average citizen in California uses only about 60 percent of the energy that used in the rest of the country. Now, I know a lot of Californians. They are the biggest delegation here, and none of them believe that they have a lesser quality of life in California than we have in Mississippi or Oregon or Maryland, and they have done that through, much of it voluntary. Not all of it voluntary.

Let us go back to the other chart to show the route California has been following to get where they are. The next is organized voluntary conservation. By the way, there were no rolling blackouts in California because they voluntarily reduced their consumption of electricity by 11 percent which avoided the rolling blackouts that we were sure they were going to have. Now we have organized voluntary conservation. Let us work together. Let us share our experiences.

Monetary incentives, something where government can get involved. Policies for voluntary conservation.

Efficient technology retrofits. How can we live as well as we are living now using much less energy? We were a very creative people. We really can do this.

Finally, monetary incentives that will increase our efficiency.

The last chart we are going to show here kind of capitulates this and looks at where we are and what we need to be doing. What we clearly need to do is buy time. Remember that earlier chart

we are showed, Hubbert's Peak and the 2 percent exponential increase in use of energy? We have got to buy some time or we will be sliding down the other side of Hubbert's Peak, and you buy time by conservation and efficiency.

Conservation you can do very quickly. Turn down the thermostat. Turn out the light when you are not using it. Drive less in your car. Car pool. There are a lot of things we can do for efficiency.

We can buy time by using new technologies. Conservation and efficiency of course go hand in hand. Conservation you can do more quickly. Efficiency you have to develop the technologies to be more efficient. We have done that by the way. Our refrigerators today probably use half the electricity they did a couple of decades ago.

Then we need to use this time wisely. Once we bought some time we need to use wisely.

Now we are about out of time in our special order this evening, and I would like to talk a little bit at another time about Jevons' Paradox and how if the whole world does not do this, Jevons' Paradox which says the harder you work on some problems the worse they get.

Jevons' Paradox could be a real problem here. The whole world really needs to work together here. Suppose we really do have to and conserve and become more efficient and save a lot of oil and all that happens is that makes it more available to China to grow their economy and grow their military? That is an application of Jevons' Paradox. We are working real hard to solve the problem. And from our personal perspective and national security perspective in this country, we have just made the problem worse because we have made more oil and gas available for China.

But we are all in this boat together and the whole world needs to work together. Let us assume we do. Then we need to use it wisely and we need to make the investments in these alternatives that we should have been making. We have known for at least 25 years that peak oil was coming. If Hubbert was right about the United States, Mr. Speaker, then why was he not right about the world and why did we waste the last 25 years and paid no attention to the obvious necessity of freeing ourselves from this dependence on fossil fuels. For oil, much of that comes, two-thirds of it we import, much of that as the President says from countries that do not even like us.

The benefits of this, additional benefits include business opportunities. We are a very creative culture. We have lots of opportunities to make contributions here. Potential worldwide markets, if we are going to pioneer domestic job creation, environmentally benign technologies that are not producing greenhouse gases.

We need to be a role model. Like it or not we are a leader in the world. We

use a fourth of the world's oil, a fourth of the world's energy, we are a fourth of the world's economy. We are a role model. We have got to be a role model.

Mr. Speaker, I hope we can be a good role model, inspiring the rest of the world to do what needs to be done to conserve, have more efficiency, to buy time, to invest that very wisely. This can create a whole new economy with all of the technologies that are necessary to transition to these renewables.

By the way, Mr. Speaker, we have to have some other way of measuring success other than how much energy you use, a bigger car, a more expensive vacation, an enormous house that you heat and cool. These are the signs of success and they all require more energy. We are going to have to have a different yard stick by which we measure success. We can do it. I am sure we can but will not do it unless we mobilize, unless we all understand that this is something that we need to work together to solve.

Mr. Speaker, I have confidence that America can rise to this challenge, but the real challenge now is for all of us to understand that if we do not do this we are going to face a very bleak future as was quoted from all of these experts that Matt Savinar quotes in his article.

#### LEAVE OF ABSENCE

By unanimous consent, leave of absence was granted to:

Ms. CARSON of Indiana (at the request of Ms. PELOSI) for today on account of an appointment in the district.

Mr. DAVIS of Illinois (at the request of Ms. PELOSI) for today on account of business in the district.

Ms. KILPATRICK of Michigan (at the request of Ms. PELOSI) for today and May 17.

Mr. LARSON of Connecticut (at the request of Ms. PELOSI) for today and the balance of the week on account of a family medical emergency.

Ms. MILLENDER-MCDONALD (at the request of Ms. PELOSI) for today.

Mr. POMEROY (at the request of Ms. PELOSI) for today on account of official business.

Ms. WASSERMAN SCHULTZ (at the request of Ms. PELOSI) for today.

Ms. WATERS (at the request of Ms. PELOSI) for today on account of personal business.

Mr. KANJORSKI (at the request of Ms. PELOSI) for today and before 1:00 p.m. May 17 on account of official business in the district.

Mr. BARRETT of South Carolina (at the request of Mr. DELAY) for today on account of family reasons.

#### SPECIAL ORDERS GRANTED

By unanimous consent, permission to address the House, following the legislative program and any special orders heretofore entered, was granted to:

(The following Members (at the request of Ms. WOOLSEY) to revise and extend their remarks and include extra-

neous material:)

Ms. WOOLSEY, for 5 minutes, today.

Mr. BROWN of Ohio, for 5 minutes, today.

Mr. EMANUEL, for 5 minutes, today.

Ms. KAPTUR, for 5 minutes, today.

Ms. HERSETH, for 5 minutes, today.

Ms. JACKSON-LEE of Texas, for 5 minutes, today.

Mrs. MALONEY, for 5 minutes, today.

(The following Members (at the request of Mr. GUTKNECHT) to revise and extend their remarks and include extraneous material:)

Mr. FRANKS of Arizona, for 5 minutes, today.

Mr. GUTKNECHT for 5 minutes, May 23.

Mr. BILIRAKIS, for 5 minutes, May 19.

Mr. GINGREY, for 5 minutes, today.

Mr. POE, for 5 minutes, May 19.

#### ADJOURNMENT

Mr. BARTLETT of Maryland. Mr. Speaker, I move that the House do now adjourn.

The motion was agreed to; accordingly (at 10 o'clock and 58 minutes p.m.), under its previous order, the House adjourned until tomorrow, Tuesday, May 17, 2005, at 9 a.m., for morning hour debates.

#### EXPENDITURE REPORTS CONCERNING OFFICIAL FOREIGN TRAVEL

Reports concerning the foreign currencies and U.S. dollars utilized for speaker-authorized official travel during the first quarter of 2004 and the first quarter of 2005, pursuant to Public Law 95-384 are as follows:

AMENDED REPORT OF EXPENDITURES FOR OFFICIAL FOREIGN TRAVEL, MR. BRYAN DAVIS AND HON. DONALD A. MANZULLO, HOUSE OF REPRESENTATIVES, EXPENDED BETWEEN OCT. 22 AND OCT. 25, 2003

Name of Member or employee	Date		Country	Per diem <sup>1</sup>		Transportation		Other purposes		Total	
	Arrival	Departure		Foreign currency	U.S. dollar equivalent or U.S. currency <sup>2</sup>	Foreign currency	U.S. dollar equivalent or U.S. currency <sup>2</sup>	Foreign currency	U.S. dollar equivalent or U.S. currency <sup>2</sup>	Foreign currency	U.S. dollar equivalent or U.S. currency <sup>2</sup>
Bryan Davis .....	10/22	10/25	Italy .....			( <sup>3</sup> ) .....					
Hon. Donald Manzullo .....	10/22	10/25	Italy .....	1,073.00						1,073.00	6,696.61
Committee total .....											6,696.61

<sup>1</sup> Per diem constitutes lodging and meals.

<sup>2</sup> If foreign currency is used, enter U.S. dollar equivalent; if U.S. currency is used, enter amount expended.

<sup>3</sup> Returned 30 E.

DONALD A. MANZULLO, Chairman, May 4, 2005.

#### REPORT OF EXPENDITURES FOR OFFICIAL FOREIGN TRAVEL, MR. JASON FENTON, HOUSE OF REPRESENTATIVES, EXPENDED BETWEEN FEB. 21 AND MAR. 1, 2005

Name of Member or employee	Date		Country	Per diem <sup>1</sup>		Transportation		Other purposes		Total	
	Arrival	Departure		Foreign currency	U.S. dollar equivalent or U.S. currency <sup>2</sup>	Foreign currency	U.S. dollar equivalent or U.S. currency <sup>2</sup>	Foreign currency	U.S. dollar equivalent or U.S. currency <sup>2</sup>	Foreign currency	U.S. dollar equivalent or U.S. currency <sup>2</sup>
Jason Fenton .....	2/21	3/1	China .....		894.00		5,889.02				6,783.02
Committee total .....					894.00		5,889.02				6,783.02

<sup>1</sup> Per diem constitutes lodging and meals.

<sup>2</sup> If foreign currency is used, enter U.S. dollar equivalent; if U.S. currency is used, enter amount expended.

JASON FENTON, Apr. 4, 2005.